# Scarring,
# effects of early career unemployment

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WSE-Report

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## Abstract

Young people often experience difficulties when entering the labour market. Therefore the youth unemployment rate usually is much higher than the adult unemployment rate. While early career unemployment spells may be temporary, there is some evidence that these spells may impose enduring disadvantages on the individuals, such as lower wages or more and longer subsequent unemployment spells. This paper focuses on this last possibility. Using data from the Flemish PES, the results of a two-part model show that unemployment at the beginning of the career indeed has a negative effect on the later unemployment chances and duration. These scarring effects seem to fade a little as time goes by, but even a decade after leaving education they still remain quite substantial. The hypothesis that the negative effects are stronger for people with a weak labour market position is refuted. Finally, we find that the extent of the scarring depends on the business cycle at the time of graduation; the negative effects are reduced for those who enter the labour market in times of high unemployment.

Keywords: Youth unemployment – scarring – two-part model

Jel classification: J64

# 1. Scarring
# Effects of early career unemployment

In times of high or rising unemployment compelling questions about the long-term consequences of such unemployment are raised. In this report we specifically look at the effects of unemployment at the beginning of the career. First, because young people are traditionally more affected by a crisis in the labour market. Second, because one could argue that unemployment at the beginning of the career might leave a more profound impression, both on the individual as on the society as a whole.

In economic literature generally two possible consequences of early unemployment are cited. Firstly, one often experiences more or longer subsequent unemployment spells, which is the focus of this paper. Secondly, future earnings seem to be lower when compared to people that experience a less problematic career start.

## 2. Theory

The apparent persistence in unemployment occurrence can be caused by several processes.

It is likely that individual characteristics play an important role. Certain individuals might be more prone to unemployment due to a low education or other unfavourable characteristics. Unfortunately, the effects of a lot of characteristics remain unknown. Nor can they be observed in the datasets used to perform research on, or even by, for instance, a caseworker of the PES (Public Employment Service).

Next, there might be something called ‘scarring’. Scarring or state dependence implies that the mere experience of unemployment will increase future unemployment risks. In this case, the past experience of unemployment has a genuine behavioural effect. An otherwise identical individual, who experienced an early unemployment spell, will behave differently in the future, than the individual that did not experience early unemployment.

In the literature several reasons for the scarring phenomenon can be found. They can be linked either to the supply side or to the demand side of the labour market.

- Most of the time the human capital theory (Becker, 1964) is referred to. This theory claims that one’s human capital will accrue by either formal education or on-the-job-training. Thus, periods of unemployment will generally affect the accumulation of human capital negatively. Long periods could even cause a depreciation of human capital due to the destruction of existing skills and/or deterioration of work attitudes, self confidence, etc.

- Next, one should realize that not only human, but also social capital might be subject to deterioration or erosion. Social capital is most commonly described as social networks or the collection of social relations that have productive benefits. People with well-developed (informal) networks are likely to receive (more) job offers. Unemployment spells could weaken these relations such that the probability of finding employment is lowered (Granovetter, 1974). In the case of young people entering the labour market, an early unemployment spell might prevent these networks from developing altogether.

- Closely linked with the former, past unemployment experiences might change preferences or constraints that will determine future unemployment spells. If unemployment causes young people to spend more time with other unemployed, they may end up with a reference group with weak labour force attachment. This might, in its turn, change their preferences for both work and leisure.

- Focusing on the demand side, it is established that scarring can also occur as a consequence of imperfect information in the labour market. When hiring employees, employers are often faced with a lot of uncertainties regarding the productivity of the different applicants. This problem is extensively described in the signaling theory (Spence, 1973). The signaling theory further explains how employers rely on certain signals to deal with this asymmetric information or uncertainty. Periods of unemployment may convey a signal of low productivity to potential employers. These might be inclined to think that there must be something wrong with an individual who experienced a long period of unemployment at the beginning of his/her career, and thus prefer another candidate.

- Further, unemployed individuals may lower their reservation wage with the passage of time (Mortensen, 1977) and accept poorer quality jobs. These jobs are potentially less stable and more likely to be destroyed. As such, successive unemployment spells may be caused. This kind of reasoning can be situated within the segmented labour market theory.

- Lastly, also the “last in, first out” firm practice may explain a causal relationship between consecutive unemployment spells, especially for young people, i.e. the entrants in the labour market.

Also some arguments against negative state dependence or scarring can be listed.

- First of all, some people might use their time out of work to invest in education or training programs. For them, an unemployment spell may be an opportunity to improve their human capital, thus, being out of work has a silver lining.

- Furthermore, search theory (Marimon & Zilibotti 1999) suggests that an unemployment spell can be productive in ensuring a better match between job and job-seeker, i.e. the individual might find a job that better fits his/her needs and preferences. The process of shopping around would be particularly important for individuals with little information about opportunities in de labour market, such as school-leavers.

- Finally, an (early) unemployment spell might scare the individual such that he/she will be very motivated to look for or keep a job.

The existence of true state dependence or scarring is not only scientifically interesting, but also a policy issue. If there is genuine state dependence in unemployment occurrence, an unemployment spell has a real and possibly lasting effect on the future probability of unemployment. In this case, prevention of an initial unemployment spell will also alleviate unemployment in the longer term and raise the government revenues from employment. Thus, it is clear that in case of scarring policy should be aimed at a smooth transition from school to labour market for every school-leaver.

On the other hand, when there does not seem to be true state dependence with respect to unemployment occurrence, this implies that the observed persistence is caused by other factors. In this case economic policies to prevent or shorten the initial unemployment spell, will have no effect on employment or unemployment at long-term. One might therefore consider concentrating scarce means on the subset of school-leavers that have unfavourable labour market characteristics.

Aside from the question whether unemployment persistence is caused by true state dependence or other factors, other questions can turn out to be important when designing policy.

Firstly, it would be interesting to know to what extent the detrimental effects of unemployment are permanent or not.

Further, it is not inconceivable that there might be some heterogeneity in the scarring itself. Some individuals might be more affected by an unemployment spell than others. Also the effect of business cycles might come into play here. The probability of unemployment will clearly be higher for school-

leavers in times of recession. However if signaling plays an important part in scarring these unemployment spells will probably be less disadvantageous.

Finally, not all unemployment spells might have a similar negative influence. One could wonder whether there exists a minimum duration threshold. In this case state dependence can be described more as lagged duration dependence instead of as mere occurrence dependence.

## 3. Empirics

In the last two decades quite some studies were devoted to scarring. Even though theoretics suggest that the mere experience of unemployment could damage future employment prospects, the existence of such scarring or state dependence is not straightforward to establish empirically, since statistical artifacts can induce spurious state dependence.

Early American studies (Heckman & Borjas 1980, Ellwood 1982, Corcoran & Hill 1985) have found little evidence of genuine state dependence in unemployment. They conclude that persistence in unemployment is due to personal differences in the propensity for unemployment. More recently, American studies have shifted attention to the effects of unemployment on future wages. There, Kletzer & Fairly (1999) and Mroz & Savage (2006) do find evidence of genuine and long-lived scarring.

Europe, however, has a quite different labour market and social security system. Numerous European studies do find (some) evidence of genuine state dependence with respect to the occurrence of unemployment.

Naredranathan & Elias (1993) studied a cohort of 23-year-old British men and conclude that the odds of becoming unemployed are higher for those who were recently unemployed. Also Arulampalam et al. (2000), using BHPS (British Household Panel Survey), found that joblessness increases the risk of future unemployment, especially for men. Similarly, Gregg (2001) concludes on the basis of NCDS-data (National Child Development Study), that men who experience unemployment early in their career are more out of work when older. Finally, Burgess et al. (2003) use the LFS (Labour Force Survey) and find some evidence of scarring. More importantly, they point out that there is some heterogeneity in this. Their results suggest negative effects of early career unemployment for the unskilled and slightly positive effects for the more skilled.

German studies are most commonly based on the GSOEP (German Socio-Economic Panel). Flaig et al. (1993), Muhleizer & Zimmerman (1994) and Clark et al. (1999) find strong evidence for state dependency for men.

In Finland, Hämäläinen (2003) studied the school-leavers from 1988. The results suggest a sizable scarring effect of the incidence of unemployment. However, university graduates turn out to be relatively immune for scarring.

Nordström Skans (2004) used a unique Swedish sibling database and showed that experiences of unemployment subsequent to graduation have negative effects on both unemployment and on earnings, at least five years after graduation.

Steijn et al. (2006) and Luijkx & Wolbers (2009) recently looked at state dependence in the Netherlands. The former find that there is scarring and that the negative consequences have a larger effect as the duration of the initial unemployment spell is longer. The latter suggest that scarring is more a matter of lagged duration dependence than of mere occurrence dependence, i.e. the duration of the previous unemployment spell is more important than the occurrence of a previous unemployment spell. Both studies reject the hypothesis that some groups (e.g. unskilled or women) would be more affected by the negative side effects of their first labour market status.

The results of the Belgian studies on scarring are mixed. Cahuzac (1998) finds no evidence for genuine state dependence. As in the American studies, he points out that the persistence in unemployment is partly due to the data collection procedures and to unmeasured, though relevant personal characteristics. D'Addio et al. (2002) and Gangji & Plasman (2007) both use PSBH-data (Panel Study on Belgian Households). They find that periods of unemployment in the past are reflected in current labour market positions and wages. Cockx & Picchio (2009), finally, find that for Belgian school-leavers there exists negative occurrence and lagged duration dependence with respect to unemployment. They emphasize however that there is a positive impact of the occurrence of past employment on subsequent employment which is larger than that of past unemployment on subsequent unemployment.

Overall, recent evidence suggests that genuine state dependence exists. Nevertheless one should bear in mind that estimates are likely to be upward biased if the observed and measured characteristics of individuals fail to control for all relevant individual heterogeneity.

# 4. Analysis

## 4.1 The data

In Belgium, school-leavers that have not yet worked, are entitled to some kind of unemployment benefit, the so-called waiting benefit (wachtuitkering). This entitlement is, as the unemployment benefit, in principle unlimited in duration. The level of the waiting benefit is only slightly above social assistance, thus relatively low. Before an unemployed school-leaver can claim this benefit there is a qualifying period dependent on his/her age at the time of registration. This period amounts to 155 working days (incl. Saturday) for individuals younger than 18, 233 days for school-leavers between 18 and 25 and 310 days for school-leavers between 26 and 30 and starts at the moment of registration at the PES after graduation. Although they are not obliged, school-leavers thus have an important incentive to register at the PES as quickly as possible, even when they expect to find a job soon. After all, an early registration will ensure an earlier claim to waiting benefits in the event of a subsequent unemployment spell.

The micro-data we use, are obtained from the Flemish PES, the VDAB (Vlaamse Dienst voor Arbeidsbemiddeling). The VDAB keeps records on all unemployed job-seekers in Flanders, providing information on the unemployment spell and the individual characteristics of the job-seeker. The dataset, as used here, goes back to August 1995 and runs to September 2009, thus making it possible to reconstruct an individual's unemployment history over 14 years.

The first sample we selected from this database, are people between 18 and 25 who register for the first time as a school-leaver between June 1996 and October 1996. This sample contains 41 784 individuals. As was mentioned before, a major advantage of this data is the long observation window. We are able to follow the selected individuals during 14 years, which is a very long period when compared to other datasets or studies. Another advantage of using these administrative data is that it is not troubled by memory bias as survey data can be. A major drawback, however, is the fact that we only have information on the individuals when they are registered as a job-seeker with VDAB. Given their age and the fact that a registration with VDAB is obligatory to claim unemployment or waiting benefits, we can presume that they are working when not registered as an unemployed job-seeker, but this cannot be inferred from the data.

To infer something about the influence of the business cycle a second sample was selected, gathering all people between 18 and 25 who register for the first time as a school-leaver between June and October from 1996 to 2002. This sample amounts to 252 610 individuals, whom we follow during almost 7 years.

In the theoretical section was explained how individual characteristics might account for (part of) the persistence in unemployment occurrence. Therefore it is important to include as many relevant variables as possible into the empirical model. Table 1 provides an overview of the summary statistics of the explanatory variables used in our analysis: age, gender, educational attainment, mobility, nationality/ethnicity, place of residence and month of registration.

**Table 1** Summary statistics of the background variables of 1996 school-leavers (N= 41 784).

| Variable | Mean | Min | Max |
|---|---|---|---|
| Woman | 0.52 | 0 | 1 |
| Man | 0.48 | 0 | 1 |
| Age at graduation | 20.88 | 18 | 25 |
| European descent | 0.96 | 0 | 1 |
| Non-European descent | 0.04 | 0 | 1 |
| No secondary education | 0.16 | 0 | 1 |
| Secondary education | 0.43 | 0 | 1 |
| Tertiary education | 0.41 | 0 | 1 |
| Residency in Antwerpen | 0.25 | 0 | 1 |
| Residency in Limburg | 0.17 | 0 | 1 |
| Residency in Oost-Vlaanderen | 0.24 | 0 | 1 |
| Residency in Vlaams Brabant | 0.16 | 0 | 1 |
| Residency in West-Vlaanderen | 0.18 | 0 | 1 |
| Weak functional urbanization | 0.44 | 0 | 1 |
| Moderate functional urbanization | 0.21 | 0 | 1 |
| Strong functional urbanization | 0.35 | 0 | 1 |
| Driving licence | 0.59 | 0 | 1 |
| Car | 0.46 | 0 | 1 |
| Registration in June | 0.11 | 0 | 1 |
| Registration in July | 0.52 | 0 | 1 |
| Registration in August | 0.17 | 0 | 1 |
| Registration in September | 0.15 | 0 | 1 |
| Registration in October | 0.05 | 0 | 1 |

Sex differences are investigated by distinguishing men and women.

Concerning nationality/ethnicity we classify into two categories: European descent (incl. Belgian descent) and non-European descent

Within the educational categories three different sublevels are distinguished; people who did not obtain a degree from higher secondary education, people whose highest degree is one of secondary education and people who obtained a degree from tertiary education (i.e. academic or higher professional education).

A region dummy indicates in which Flemish province the unemployed has his/her place of residence. Another set of dummies provides more information on the functional urbanization of this place of residence. The level of functional urbanization indicates the presence and importance of different functions (commerce, education and employment) within a village or city.[1]

A set of inflow dummies indicate in which month the school-leaver registered with the PES. The moment of registration can be seen as a proxy for motivation, one could suspect that people who register immediately after graduating, are more motivated to search for a job than the ones that only register in October. Another explanation could be that the time of registration is closely linked to school results: people graduating in June, can register in June or July, others might have to resit an exam and

[1] http://statbel.fgov.be

can only register in September or October. Employers will most likely take these school results into account when hiring someone.

Since mobility can be of great importance when looking for a job, two mobility dummies are included. The first indicating whether one has obtained his/her driving licence, the second whether he/she disposes of a car to go to work. Young unemployed typically score worse on these covariates.

The variable of interest when studying scarring, the early unemployment, is defined in this paper as the cumulative duration of unemployment spells in the first 18 months after leaving education and registering with the PES. Since all individuals have to register at least once with the PES to be selected into our sample, the minimum duration of early unemployment is 1. To include the full effect of the early unemployment we also take into account the squared value in our models. Table 2 indicates that, on average school-leavers of 1996 are almost 7 months unemployed during the first 18 months after graduation.

**Table 2** Early unemployment

| Variable | Mean | Min | Max |
|---|---|---|---|
| Duration of unemployment in first 18 months | 6.92 | 1 | 18 |
| Duration of unemployment in first 18 months - squared | 69.64 | 1 | 324 |

The dependent covariate in our analysis, the later unemployment, is the proportion of a certain period the individual turns out to be unemployed. We look at different time periods of the later career. First of all, there is the main period between 01.1998 and 09.2009. Next, for the persistence analysis, this period is divided in smaller segments (01.1998-12.2000, 01.2001-12.2003, 01.2004-12.2006 and 01.2007-12.2009). Finally for the business cycle analysis we use the larger sample with school-leavers from 1996 to 2002 and we calculate the percentage of the time they are unemployed within 5 years of their later career. The summary statistics are shown in table 3. Since a substantial share of the individuals do not become unemployed again, this table also includes the results when the zero observations are ignored.

**Table 3** Later unemployment (in percentages)

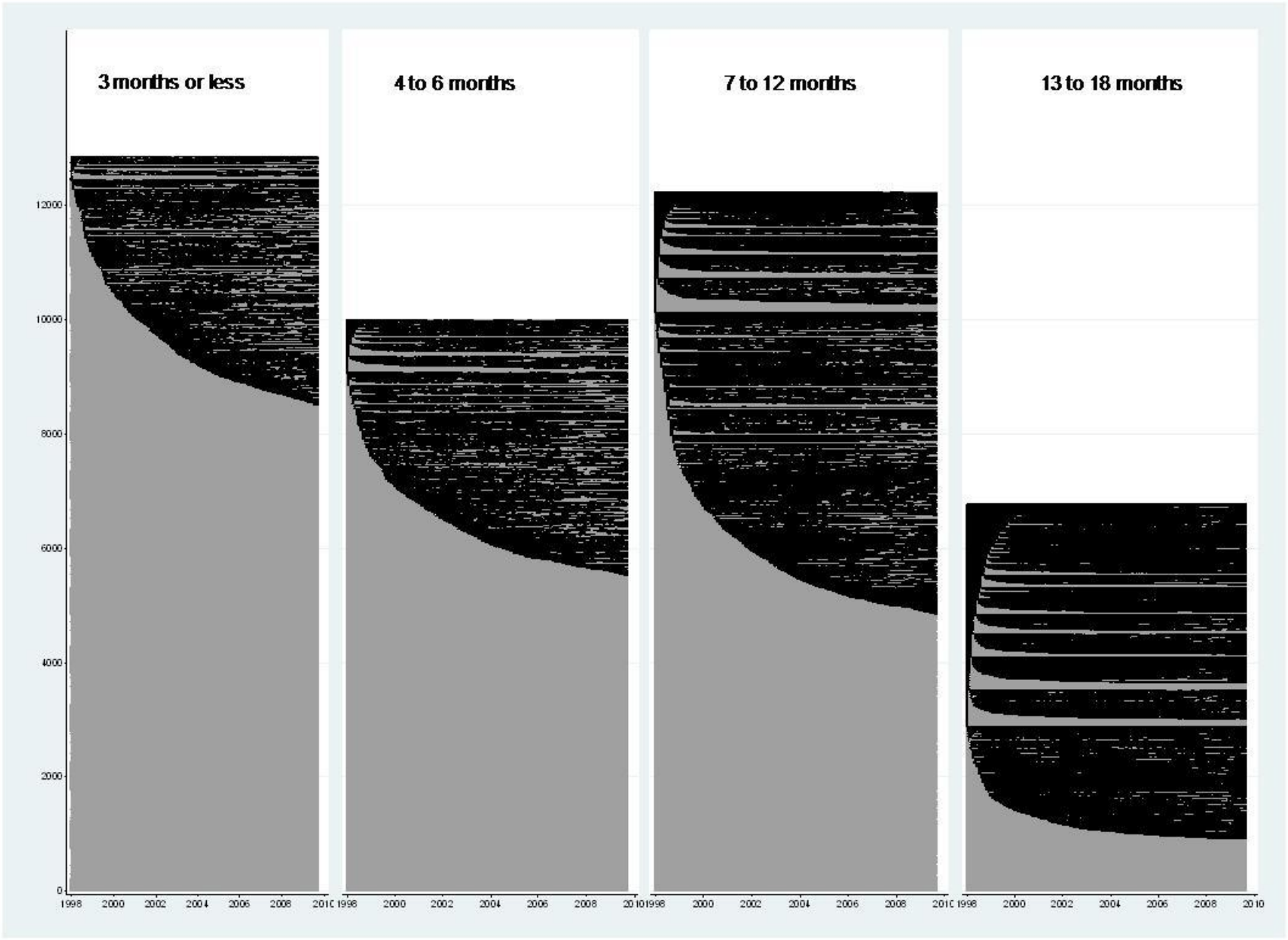
| Percentage of the period an individual is unemployed | N | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| Including zero observations | | | | | |
| 1996-school-leavers | | | | | |
| 01.1998-09.2009 (141 months) | 41784 | 7.0 | 13.3 | 0.0 | 100.0 |
| 01.1998-12.2000 (36 months) | 41784 | 10.2 | 19.2 | 0.0 | 100.0 |
| 01.2001-12.2003 (36 months) | 41784 | 6.9 | 17.0 | 0.0 | 100.0 |
| 01.2004-12.2006 (36 months) | 41784 | 6.2 | 17.0 | 0.0 | 100.0 |
| 01.2007-09.2009 (33 months) | 41784 | 4.5 | 14.4 | 0.0 | 100.0 |
| 1996-2002-school-leavers | | | | | |
| between month 19 and 79 after graduation | 252610 | 9.3 | 17.2 | 0.0 | 100.0 |
| excluding zero observations | | | | | |
| 1996-school-leavers | | | | | |
| 01.1998-09.2009 (141 months) | 22047 | 13.3 | 16.0 | 0.7 | 100.0 |
| 01.1998-12.2000 (36 months) | 17339 | 24.5 | 23.2 | 2.8 | 100.0 |
| 01.2001-12.2003 (36 months) | 10470 | 27.5 | 24.4 | 2.8 | 100.0 |
| 01.2004-12.2006 (36 months) | 8291 | 31.3 | 25.8 | 2.8 | 100.0 |
| 01.2007-09.2009 (33 months) | 6392 | 29.5 | 25.2 | 3.0 | 100.0 |
| 1996-2002-school-leavers | | | | | |
| between month 19 and 79 after graduation | 115019 | 20.4 | 20.5 | 1.6 | 100.0 |

Between 01.1998 and 09.2009 the registered school-leavers of 1996 are, on average, 7% of the time, or almost 10 months, unemployed.

### 4.2 Descriptive analysis

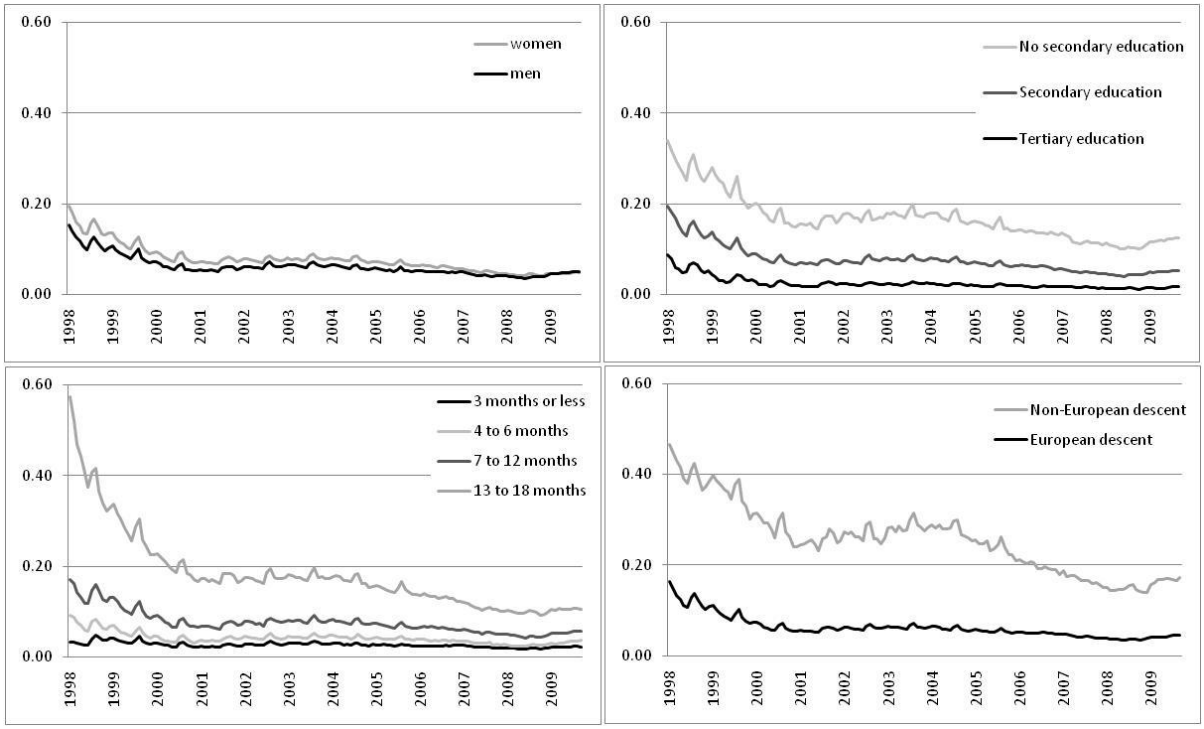
An often-used technique to visualize patterns is the so-called sequence index plotting (Scherer 2001). The idea is to draw a horizontal line for each individual, separating the different elements of his/her pathway with different colors. Graph 1 shows the careers of the 41 784 school-leavers, that registered with VDAB in 1996. Each horizontal line represents the pathway of one of these individuals from 01.1998 to 09.2009. A black line segment indicates that the person in question was registered as a non-employed job-seeker at that time, a grey line segment indicates that he/she is not and could be working. This group of school-leavers is divided in four subgroups according to the number of months they were unemployed during the first 18 months after registering as a job-seeker for the first time. We distinguish the following categories: 3 months or less, 4 to 6 months, 7 to 12 months and 13 to 18 months.

The graph shows that a proportion of school-leavers seems to make a smooth transition to the labour market and do not register as a job-seeker again, but that this proportion substantially diminishes as the cumulative unemployment duration at the beginning or their career rises. In the third block, the black or unemployment periods are clearly dominant.




**Graph 1** Sequence index plot: careers of 1996-school-leavers from 01.1998 to 09.2009

In the following graphs these patterns are aggregated as the unemployment rate within the selected sample. The four graphs differentiate by duration of early unemployment experience (less than 3 months, 4 to 6 months, 7 to 12 months and 13 to 18 months), gender (men and women), educational attainment (no secondary education, secondary education, tertiary education) and descent (non- European descent and European descent).




**Graph 2** unemployment rate by background characteristics

The differences between men and women seem to remain limited. Mark however that we only know something about the people that register with VDAB as a job-seeker. Women might withdraw more from the labour market. There are big discrepancies with respect to educational attainment; people with a low education face an unemployment rate which is a lot higher than higher educated people. Also the duration of early career unemployment seems to make a difference. We observe that the unemployment rates for individuals who have been long-term unemployed after leaving education are higher than for those who experience shorter unemployment spells at the beginning of their career. Finally we also find that the unemployment rate among people of non-European descent is a lot larger than among people of European descent.

### 4.3 Multivariate analysis

In this paper we focus on the question whether the time spent in unemployment varies by early career unemployment and/or individual characteristics. To this end we estimate several two-part or hurdle models. The first part of such a model is a binary outcome equation that models the probability that a school-leaver is unemployed during his/her later career. We specify this first model as a probit. The second part uses linear regression to model the expected cumulative duration, or more specifically the log of the cumulative duration, of these later unemployment periods. Thus, this last part is only estimated for the individuals who are or become unemployed more than 18 months after graduating.

However not required, the same independent covariates are used for both equations. We include various individual characteristics recorded at the time of registration as an unemployed school-leaver: gender, age, descent, educational attainment, province of residency, functional urbanization of the

city of residency and indicators of mobility. Besides these variables, the time spent in unemployment in the first 18 months on the labour market is included.

Table 4 shows the results two two-part models that analyze the later career unemployment for the school-leavers from 1996 that registered with VDAB. In the first part all 41 784 observations were used to model the probability that a 1996-school-leaver is recorded in the VDAB-dataset as an unemployed job-seeker between 01.1998 and 09.2009. This is the case for 22 047 among them. For this subsample the second part estimates the log of the cumulative duration expressed as a percentage of the total later career, here the 141 months between 01.1998 and 09.2009.

The aim of model 1 is to test the main hypothesis, namely whether a longer unemployment period at the start of the career, will have an effect on the likelihood or duration of unemployment spells later on in the career. Model 2 ads several interaction terms: between gender, descent and educational attainment on the one hand and early unemployment duration on the other. The aim is to test whether negative effects are stronger for people with a weak labour market position, such as women, unskilled and people of non-European descent.

Most importantly, model 1 shows that the duration of early unemployment is estimated to have a sizable and significant effect both on the likelihood of later unemployment as on the cumulative duration of such later unemployment. Furthermore, the significance and sign of the squared term indicate that this negative effect increases more than linearly as the duration of the early unemployment is higher.

Model 1 further indicates that most of the background characteristics influence the probability of later unemployment. Men are less likely to become unemployed. Individuals of non-European descent are, significantly more prone to unemployment than individuals of Belgian or European descent. Also in these estimations it becomes clear that access to employment is closely related to educational achievements. People with a degree from secondary education, and people with a degree from higher professional or academic education even more so are substantially less unemployed. Furthermore, living in a city with a high functional urbanization increases the likelihood of becoming unemployed. Next, being sufficiently mobile, here defined as ‘having a driving licence’ and ‘having a car at your disposal to go to work’, may facilitate employment. The individuals that are mobile when graduating appear to become slightly less unemployment in the subsequent decade. Finally, the moment of registration with the PES turns out to have a significant and sizable impact on the probability of later unemployment. The later school-leavers register, the more likely they are to be unemployed in their later career.

The coefficients of the regressors in the second part have the same sign as this in the first part, meaning that the duration of the later unemployment spells are influenced in the same way as the mere probability of being unemployed from 01.1998 to 09.2009.

Model 2 wants to test for heterogeneity in scarring by adding interaction terms. None of these interaction terms turn out to have a statistically significant effect, neither in the first, nor in the second part of the model. We can thus refute the hypothesis that states that longer periods of early unemployment will affect weaker groups in the labour market differently.

**Table 4** Part 1: Probability of unemployment from 01.1998-09.2009

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| | Coef. | Std. Err. | z | Coef. | Std. Err. | z |
| Constant | 0.73 | 0.10 | 7.27 | 0.76 | 0.11 | 7.09 |
| Duration of unemployment in first 18 months | 0.06 | 0.01 | 9.59 | 0.05 | 0.01 | 6.66 |
| Duration of unemployment in first 18 months - squared | 0.01 | 0.00 | 6.49 | 0.01 | 0.00 | 6.87 |
| Women (ref.) | | | | | | |
| Men | -0.19 | 0.01 | -13.85 | -0.21 | 0.02 | -8.68 |
| Age at graduation | -0.03 | 0.01 | -6.13 | -0.03 | 0.01 | -6.20 |
| European descent (ref.) | | | | | | |
| Non-European descent | 0.34 | 0.04 | 8.04 | 0.51 | 0.09 | 5.85 |
| No secondary education (ref.) | | | | | | |
| Secondary education | -0.32 | 0.02 | -14.54 | -0.30 | 0.04 | -7.54 |
| Tertiary education | -0.74 | 0.03 | -25.73 | -0.78 | 0.04 | -17.61 |
| Antwerpen (ref.) | | | | | | |
| Limburg | 0.14 | 0.02 | 6.29 | 0.14 | 0.02 | 6.29 |
| Oost-Vlaanderen | -0.01 | 0.02 | -0.62 | -0.01 | 0.02 | -0.61 |
| Vlaams Brabant | -0.04 | 0.02 | -1.87 | -0.04 | 0.02 | -1.86 |
| West-Vlaanderen | -0.05 | 0.02 | -2.26 | -0.05 | 0.02 | -2.24 |
| Weak functional urbanization (ref.) | | | | | | |
| Moderate functional urbanization | 0.01 | 0.02 | 0.62 | 0.01 | 0.02 | 0.62 |
| Strong functional urbanization | 0.10 | 0.02 | 6.74 | 0.10 | 0.02 | 6.76 |
| Driving licence | -0.07 | 0.02 | -3.34 | -0.07 | 0.02 | -3.39 |
| Car | -0.12 | 0.02 | -6.74 | -0.12 | 0.02 | -6.71 |
| Registration in June (ref.) | | | | | | |
| Registration in July | 0.01 | 0.02 | 0.31 | 0.01 | 0.02 | 0.30 |
| Registration in August | 0.10 | 0.03 | 3.89 | 0.10 | 0.03 | 3.89 |
| Registration in September | 0.12 | 0.03 | 4.51 | 0.12 | 0.03 | 4.51 |
| Registration in October | 0.21 | 0.04 | 5.53 | 0.21 | 0.04 | 5.52 |
| *Interactions* | | | | | | |
| Men x duration of unemployment in first 18 months | | | | 0.00 | 0.00 | 1.08 |
| Non-European descent x duration of unemployment in first 18 months | | | | -0.02 | 0.01 | -1.89 |
| Secondary education x duration of unemployment in first 18 months | | | | 0.00 | 0.00 | -0.55 |
| Tertiary education x duration of unemployment in first 18 months | | | | 0.01 | 0.00 | 1.39 |

**Table 4 (ctn.)** Part 2: Linear regression of ln (cumulative duration of unemployment from 01.1998-09.2009 (in %)) for individuals that become unemployed again

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| | Coef. | Std. Err. | t | Coef. | Std. Err. | t |
| Constant | -2.77 | 0.12 | -23.75 | -2.77 | 0.12 | -22.37 |
| Duration of unemployment in first 18 months | 0.03 | 0.01 | 4.53 | 0.03 | 0.01 | 3.90 |
| Duration of unemployment in first 18 months - squared | 0.01 | 0.00 | 4.31 | 0.01 | 0.00 | 4.11 |
| Women (ref.) | | | | | | |
| Men | -0.19 | 0.02 | -11.74 | -0.17 | 0.03 | -5.22 |
| Age at graduation | 0.01 | 0.01 | 1.48 | 0.01 | 0.01 | 1.47 |
| European descent (ref.) | | | | | | |
| Non-European descent | 0.63 | 0.03 | 19.01 | 0.70 | 0.08 | 8.28 |
| No secondary education (ref.) | | | | | | |
| Secondary education | -0.47 | 0.02 | -22.71 | -0.50 | 0.04 | -11.62 |
| Tertiary education | -0.92 | 0.03 | -28.15 | -0.88 | 0.05 | -16.59 |
| Antwerpen (ref.) | | | | | | |
| Limburg | 0.08 | 0.02 | 3.49 | 0.08 | 0.02 | 3.44 |
| Oost-Vlaanderen | -0.05 | 0.02 | -2.30 | -0.05 | 0.02 | -2.32 |
| Vlaams Brabant | -0.13 | 0.03 | -4.96 | -0.13 | 0.03 | -4.97 |
| West-Vlaanderen | -0.08 | 0.02 | -3.32 | -0.08 | 0.02 | -3.33 |
| Weak functional urbanization (ref.) | | | | | | |
| Moderate functional urbanization | -0.02 | 0.02 | -0.85 | -0.02 | 0.02 | -0.88 |
| Strong functional urbanization | 0.10 | 0.02 | 5.78 | 0.10 | 0.02 | 5.78 |
| Driving licence | -0.18 | 0.02 | -7.68 | -0.18 | 0.02 | -7.62 |
| Car | -0.11 | 0.02 | -4.66 | -0.11 | 0.02 | -4.69 |
| Registration in June (ref.) | | | | | | |
| Registration in July | 0.01 | 0.03 | 0.30 | 0.01 | 0.03 | 0.31 |
| Registration in August | 0.11 | 0.03 | 3.77 | 0.11 | 0.03 | 3.77 |
| Registration in September | 0.12 | 0.03 | 4.13 | 0.12 | 0.03 | 4.14 |
| Registration in October | 0.25 | 0.04 | 6.18 | 0.25 | 0.04 | 6.19 |
| *Interactions* | | | | | | |
| Men x duration of unemployment in first 18 months | | | | 0.00 | 0.00 | -0.77 |
| Non-European descent x duration of unemployment in first 18 months | | | | -0.01 | 0.01 | -0.92 |
| Secondary education x duration of unemployment in first 18 months | | | | 0.00 | 0.00 | 0.87 |
| Tertiary education x duration of unemployment in first 18 months | | | | -0.01 | 0.00 | -1.13 |
| | - | | | - | | |
| Joint log likelihood | 58317.86 | | | 58308.27 | | |

To assess the persistence of the scarring effects the later career is divided in smaller segments. Table 5 shows the results for model 3a to 3d respectively modeling the probability and cumulative duration from 01.1998 to 12.2000, 01.2001 to 12.2003, 01.2004 to 12.2006 and 01.2007 to 09.2009.

**Table 5** Part 1: Probability of unemployment from 01.1998-12.2000, 01.2001-12.2003, 01.2004-12.2006 and 01.2007-09.2009

| | Model 3a: 01.1998-12.2000 | | | Model3b: 01.2001-12.2003 | | | Model 3c: 01.2004-12.2006 | | | Model 3d: 01.2007-09.2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff | Std.Err | z | Coeff | Std.Err | z | Coeff | Std.Err | z | Coeff | Std.Err | z |
| Constant | 0.26 | 0.10 | 2.61 | 0.02 | 0.11 | 0.18 | -0.08 | 0.11 | -0.70 | -0.57 | 0.12 | -4.78 |
| Duration of unemployment in first 18 months | 0.06 | 0.01 | 8.81 | 0.06 | 0.01 | 9.39 | 0.05 | 0.01 | 8.48 | 0.04 | 0.01 | 6.08 |
| Duration of unemployment in first 18 months - squared | 0.00 | 0.00 | 9.36 | 0.00 | 0.00 | -0.61 | 0.00 | 0.00 | -1.92 | 0.00 | 0.00 | -0.91 |
| Women (ref.) | | | | | | | | | | | | |
| Men | -0.18 | 0.01 | -13.09 | -0.13 | 0.01 | -8.94 | -0.15 | 0.02 | -10.00 | -0.14 | 0.02 | -8.75 |
| Age at graduation | -0.03 | 0.01 | -6.20 | -0.03 | 0.01 | -5.10 | -0.03 | 0.01 | -4.61 | -0.01 | 0.01 | -1.51 |
| European descent (ref.) | | | | | | | | | | | | |
| Non-European descent | 0.29 | 0.04 | 7.56 | 0.41 | 0.03 | 11.99 | 0.43 | 0.03 | 12.54 | 0.41 | 0.03 | 11.96 |
| No secondary education (ref.) | | | | | | | | | | | | |
| Secondary education | -0.27 | 0.02 | -13.19 | -0.40 | 0.02 | -20.07 | -0.40 | 0.02 | -19.84 | -0.40 | 0.02 | -18.86 |
| Tertiary education | -0.61 | 0.03 | -21.30 | -0.80 | 0.03 | -27.04 | -0.80 | 0.03 | -25.81 | -0.83 | 0.03 | -25.29 |
| Antwerpen (ref.) | | | | | | | | | | | | |
| Limburg | 0.17 | 0.02 | 7.80 | 0.08 | 0.02 | 3.62 | 0.09 | 0.02 | 3.68 | 0.05 | 0.03 | 1.85 |
| Oost-Vlaanderen | 0.04 | 0.02 | 1.96 | -0.08 | 0.02 | -4.17 | -0.08 | 0.02 | -3.56 | -0.06 | 0.02 | -2.52 |
| Vlaams Brabant | -0.01 | 0.02 | -0.40 | -0.08 | 0.02 | -3.39 | -0.13 | 0.02 | -5.27 | -0.10 | 0.03 | -3.62 |
| West-Vlaanderen | 0.01 | 0.02 | 0.35 | -0.04 | 0.02 | -1.68 | -0.08 | 0.02 | -3.45 | -0.07 | 0.02 | -2.96 |
| Weak functional urbanization (ref.) | | | | | | | | | | | | |
| Moderate functional urbanization | 0.01 | 0.02 | 0.35 | -0.01 | 0.02 | -0.71 | 0.00 | 0.02 | -0.18 | 0.03 | 0.02 | 1.38 |
| Strong functional urbanization | 0.11 | 0.02 | 6.69 | 0.11 | 0.02 | 6.43 | 0.13 | 0.02 | 7.17 | 0.08 | 0.02 | 4.20 |
| Driving licence | -0.06 | 0.02 | -3.17 | -0.09 | 0.02 | -4.24 | -0.14 | 0.02 | -6.06 | -0.08 | 0.02 | -3.51 |
| Car | -0.11 | 0.02 | -6.09 | -0.12 | 0.02 | -5.99 | -0.08 | 0.02 | -3.73 | -0.09 | 0.02 | -3.98 |
| Registration in June (ref.) | | | | | | | | | | | | |
| Registration in July | -0.01 | 0.02 | -0.38 | 0.02 | 0.02 | 1.03 | -0.03 | 0.02 | -1.06 | -0.02 | 0.03 | -0.89 |
| Registration in August | 0.09 | 0.03 | 3.52 | 0.11 | 0.03 | 4.04 | 0.06 | 0.03 | 2.04 | 0.04 | 0.03 | 1.19 |
| Registration in September | 0.12 | 0.03 | 4.32 | 0.13 | 0.03 | 4.61 | 0.07 | 0.03 | 2.41 | 0.07 | 0.03 | 2.17 |
| Registration in October | 0.17 | 0.04 | 4.67 | 0.20 | 0.04 | 5.17 | 0.18 | 0.04 | 4.47 | 0.22 | 0.04 | 5.39 |

**Table 5 (ctn.)** Part 2: Linear regression of ln (cumulative duration of unemployment from 01.1998-12.2000, 01.2001-12.2003, 01.2004-12.2006 and 01.2007-09.2009 (in %)) for individuals that become unemployed again

| | Model 3a: 01.1998-12.2000 | | | Model3b: 01.2001-12.2003 | | | Model 3c: 01.2004-12.2006 | | | Model 3d: 01.2007-09.2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff | Std.Err | z | Coeff | Std.Err | z | Coeff | Std.Err | z | Coeff | Std.Err | z |
| Constant | -2.12 | 0.11 | -19.73 | -2.37 | 0.15 | -16.23 | -2.27 | 0.16 | -13.77 | -2.35 | 0.19 | -12.63 |
| Duration of unemployment in first 18 months | 0.02 | 0.01 | 2.81 | 0.02 | 0.01 | 2.35 | 0.03 | 0.01 | 3.48 | 0.03 | 0.01 | 2.55 |
| Duration of unemployment in first 18 months - squared | 0.00 | 0.00 | 6.70 | 0.00 | 0.00 | 2.01 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | -0.25 |
| Women (ref.) | | | | | | | | | | | | |
| Men | -0.12 | 0.01 | -8.26 | -0.11 | 0.02 | -5.50 | -0.11 | 0.02 | -4.85 | 0.02 | 0.03 | 0.92 |
| Age at graduation | 0.00 | 0.01 | 0.91 | 0.03 | 0.01 | 3.78 | 0.03 | 0.01 | 3.13 | 0.03 | 0.01 | 3.38 |
| European descent (ref.) | | | | | | | | | | | | |
| Non-European descent | 0.45 | 0.03 | 15.55 | 0.41 | 0.03 | 11.80 | 0.31 | 0.04 | 8.33 | 0.17 | 0.04 | 4.04 |
| No secondary education (ref.) | | | | | | | | | | | | |
| Secondary education | -0.29 | 0.02 | -15.44 | -0.20 | 0.02 | -8.49 | -0.14 | 0.03 | -5.17 | -0.16 | 0.03 | -5.28 |
| Tertiary education | -0.59 | 0.03 | -19.66 | -0.47 | 0.04 | -11.24 | -0.39 | 0.05 | -8.15 | -0.33 | 0.05 | -6.10 |
| Antwerpen (ref.) | | | | | | | | | | | | |
| Limburg | 0.08 | 0.02 | 3.46 | -0.01 | 0.03 | -0.26 | 0.08 | 0.03 | 2.49 | -0.08 | 0.04 | -2.11 |
| Oost-Vlaanderen | 0.00 | 0.02 | 0.05 | -0.02 | 0.03 | -0.78 | -0.01 | 0.03 | -0.37 | -0.02 | 0.03 | -0.71 |
| Vlaams Brabant | -0.06 | 0.02 | -2.55 | -0.13 | 0.03 | -4.02 | -0.06 | 0.04 | -1.54 | -0.13 | 0.04 | -3.09 |
| West-Vlaanderen | 0.00 | 0.02 | -0.01 | -0.13 | 0.03 | -4.20 | -0.10 | 0.03 | -2.87 | -0.16 | 0.04 | -4.18 |
| Weak functional urbanization (ref.) | | | | | | | | | | | | |
| Moderate functional urbanization | -0.02 | 0.02 | -0.95 | 0.04 | 0.03 | 1.58 | -0.02 | 0.03 | -0.59 | 0.02 | 0.03 | 0.72 |
| Strong functional urbanization | 0.05 | 0.02 | 3.02 | 0.10 | 0.02 | 4.60 | 0.06 | 0.03 | 2.54 | 0.08 | 0.03 | 2.77 |
| Driving licence | -0.12 | 0.02 | -5.61 | -0.15 | 0.03 | -5.17 | -0.08 | 0.03 | -2.41 | -0.10 | 0.04 | -2.49 |
| Car | -0.07 | 0.02 | -3.16 | -0.04 | 0.03 | -1.47 | -0.12 | 0.03 | -3.58 | -0.10 | 0.04 | -2.56 |
| Registration in June (ref.) | | | | | | | | | | | | |
| Registration in July | 0.05 | 0.02 | 2.10 | 0.01 | 0.03 | 0.47 | 0.00 | 0.03 | -0.12 | 0.01 | 0.04 | 0.27 |
| Registration in August | 0.13 | 0.03 | 4.69 | 0.06 | 0.04 | 1.60 | 0.06 | 0.04 | 1.60 | -0.03 | 0.05 | -0.64 |
| Registration in September | 0.11 | 0.03 | 4.13 | 0.05 | 0.04 | 1.42 | 0.07 | 0.04 | 1.62 | 0.02 | 0.05 | 0.53 |
| Registration in October | 0.19 | 0.04 | 5.20 | 0.17 | 0.05 | 3.56 | 0.11 | 0.05 | 2.11 | 0.13 | 0.06 | 2.19 |

With respect to the first part of the model, the modeling of the unemployment probability in the later career, we find that the estimated coefficients are quite similar across all four models. Woman, unskilled, people of non-European descent, people living in cities with strong functional urbanization, individuals that do not have a driving licence or a car and people that register later with the PES are more likely to be unemployed in virtually all time periods. The cumulative duration of the unemployment spells in the first 18 months still has a significant positive effect: a longer period of unemployment when leaving school increases the probability of becoming unemployed later in the career. However this effect diminishes as the individuals are longer on the labour market. This is apparent both in the omission of the quadratic term from 01.2001 onwards, as in the lowering coefficient and significance from the linear term.

In the second part of the model, were the cumulative duration of the later unemployment spells are modeled, we find the same omission of the quadratic term. The linear term however stays quite constant; slightly significant and positive. As to the background regressors we note that the dummies that indicate the time of registration are mainly of significance during the first years. From 01.2001 on only the people registering in October seems to have consistently longer unemployment durations than the individuals registering earlier.

The last model, which is shown in table 6, turns to the question whether the unemployment rate at the time of graduating has an influence on the scarring effects of early unemployment. To this end we extend our sample with the school-leavers from 1997 to 2002, which amounts to 252 610 individuals of whom 115 019 experience at least one more unemployed month in their later career. In this model the later career runs from month 19 to month 79 (i.e. 5 years) after the individuals left school. In this fourth model we further add a dummy that indicates whether the unemployment rate in the year of leaving education is high, as well as an interaction term of this dummy with the duration of unemployment in the first 18 months.

We find that the added terms have a statistically significant influence on both the probability as on the duration of later unemployment spells. In the first part of the model we find a positive coefficient associated with the unemployment rate dummy and a negative coefficient for the interaction term. This means that while a high unemployment rate at the time of leaving school increases the likelihood of unemployment in the later career, such a high unemployment rate attenuates the negative effects of early career unemployment. In the second part of the model the both coefficients turn out to be negative; the duration of later unemployment spells is lower when the individual left school in times of unfavourable economic circumstances.

**Table 6** Part 1: Probability of unemployment from month 19 to month 79 after graduation in 1996-2002

| | Model 4 | | |
|---|---|---|---|
| | Coef. | Std. Err. | z |
| Constant | 0.65 | 0.04 | 15.67 |
| Duration of unemployment in first 18 months | 0.09 | 0.00 | 34.13 |
| Duration of unemployment in first 18 months - squared | 0.01 | 0.00 | 9.98 |
| Women (ref.) | | | |
| Men | -0.14 | 0.01 | -25.71 |
| Age at graduation | -0.04 | 0.00 | -20.00 |
| European descent (ref.) | | | |
| Non-European descent | 0.33 | 0.02 | 21.75 |
| No secondary education (ref.) | | | |
| Secondary education | -0.33 | 0.01 | -40.62 |
| Tertiary education | -0.67 | 0.01 | -60.36 |
| Antwerpen (ref.) | | | |
| Limburg | 0.16 | 0.01 | 17.88 |
| Oost-Vlaanderen | -0.03 | 0.01 | -4.12 |
| Vlaams Brabant | -0.02 | 0.01 | -2.91 |
| West-Vlaanderen | 0.02 | 0.01 | 2.68 |
| Weak functional urbanization (ref.) | | | |
| Moderate functional urbanization | 0.03 | 0.01 | 4.24 |
| Strong functional urbanization | 0.11 | 0.01 | 18.08 |
| Driving licence | -0.09 | 0.01 | -11.13 |
| Car | -0.09 | 0.01 | -11.95 |
| Registration in June (ref.) | | | |
| Registration in July | 0.00 | 0.01 | -0.07 |
| Registration in August | 0.08 | 0.01 | 8.13 |
| Registration in September | 0.14 | 0.01 | 13.30 |
| Registration in October | 0.24 | 0.01 | 16.35 |
| High unemployment rate at graduation | 0.03 | 0.01 | 3.65 |
| High unemployment rate at graduation x duration of unemployment in first 18 months | -0.02 | 0.00 | -12.52 |

**Table 6 (ctn.)** Part 2 : Linear regression of ln (cumulative duration of unemployment from month 19 to month 79 (in%)) for school-leavers from 1996-2002 that become unemployed again

| | Model 4 | | |
|---|---|---|---|
| | Coef. | Std.Err | z |
| Constant | -2.27 | 0.05 | -48.38 |
| Duration of unemployment in first 18 months | 0.05 | 0.00 | 19.42 |
| Duration of unemployment in first 18 months - squared | 0.00 | 0.00 | 3.70 |
| Women (ref.) | | | |
| Men | -0.10 | 0.01 | -16.01 |
| Age at graduation | 0.01 | 0.00 | 2.98 |
| European descent (ref.) | | | |
| Non-European descent | 0.46 | 0.01 | 37.33 |
| No secondary education (ref.) | | | |
| Secondary education | -0.35 | 0.01 | -43.39 |
| Tertiary education | -0.66 | 0.01 | -51.77 |
| Antwerpen (ref.) | | | |
| Limburg | 0.07 | 0.01 | 7.42 |
| Oost-Vlaanderen | -0.04 | 0.01 | -4.46 |
| Vlaams Brabant | -0.09 | 0.01 | -9.41 |
| West-Vlaanderen | -0.03 | 0.01 | -3.38 |
| Weak functional urbanization (ref.) | | | |
| Moderate functional urbanization | 0.02 | 0.01 | 2.27 |
| Strong functional urbanization | 0.10 | 0.01 | 13.69 |
| Driving licence | -0.14 | 0.01 | -14.33 |
| Car | -0.08 | 0.01 | -8.71 |
| Registration in June (ref.) | | | |
| Registration in July | -0.03 | 0.01 | -2.49 |
| Registration in August | 0.07 | 0.01 | 6.44 |
| Registration in September | 0.07 | 0.01 | 6.29 |
| Registration in October | 0.13 | 0.02 | 8.37 |
| High unemployment rate at graduation | -0.09 | 0.01 | -7.65 |
| High unemployment rate at graduation x duration of unemployment in first 18 months | -0.01 | 0.00 | -3.97 |
| Joint log likelihood | ####### | | |

## 5. Summary and policy recommendations

This study focused on the effects of early career unemployment, more specifically on the question whether (long) unemployment spells experienced when entering the labour market, have an effect on unemployment in the later career. Based on VDAB data of the registered school-leavers, the main conclusion of this study is that unemployment early in the career does have a detrimental effect on both the subsequent unemployment probability as on the duration of this later unemployment. These scarring effects seem to fade a little as time goes by, but even a decade after leaving education they still remain quite substantial. As to the question of heterogeneity in scarring, we find that all school-leavers are equally affected by an early unemployment spell. There is no evidence that people with a weak labour market position are all the more scarred by a bad career start. We do find a difference when it comes to the economic circumstances at the time of graduation. The negative effect of early career unemployment seems to be lessened when this bad career start happened under unfavourable economic circumstances.

Why an early unemployment spell influences later career possibilities negatively is a question that remains unresolved here. Is it because of the loss of human or social capital, because of signaling, or because of other processes? In a way, this answer is unimportant for our main conclusion and recommendation, i.e. that the existence of scarring implies that there is a scope for intervention to lower the natural unemployment rate. If we can prevent the initial unemployment spells of school-leavers, we automatically prevent some of their later unemployment spells. Such a smooth transition to the labour market calls for some coordinated actions on multiple fronts. First of all, the analysis underlined the importance of education. Education lowers likelihood of becoming unemployed as well as the time spent unemployed. Most commonly a degree in secondary education is seen as the minimum credential required for a successful labour market entry. It is therefore imperative that we prevent early drop-out. Secondly, it is important that school-leavers have sufficient and realistic information about the labour market and posses the necessary job search skills. Here we see an opportunity for cooperation between PES and education. The PES could come to the classrooms and provide labour market information to the students, while schools could tighten the bonds with the labour market by attributing more importance to apprenticeship programmes. Finally, the evidence of scarring offers a strong justification for early intervention from the PES to prevent long-term youth unemployment.

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